



Action Items from the TF Workshop and the Design Review

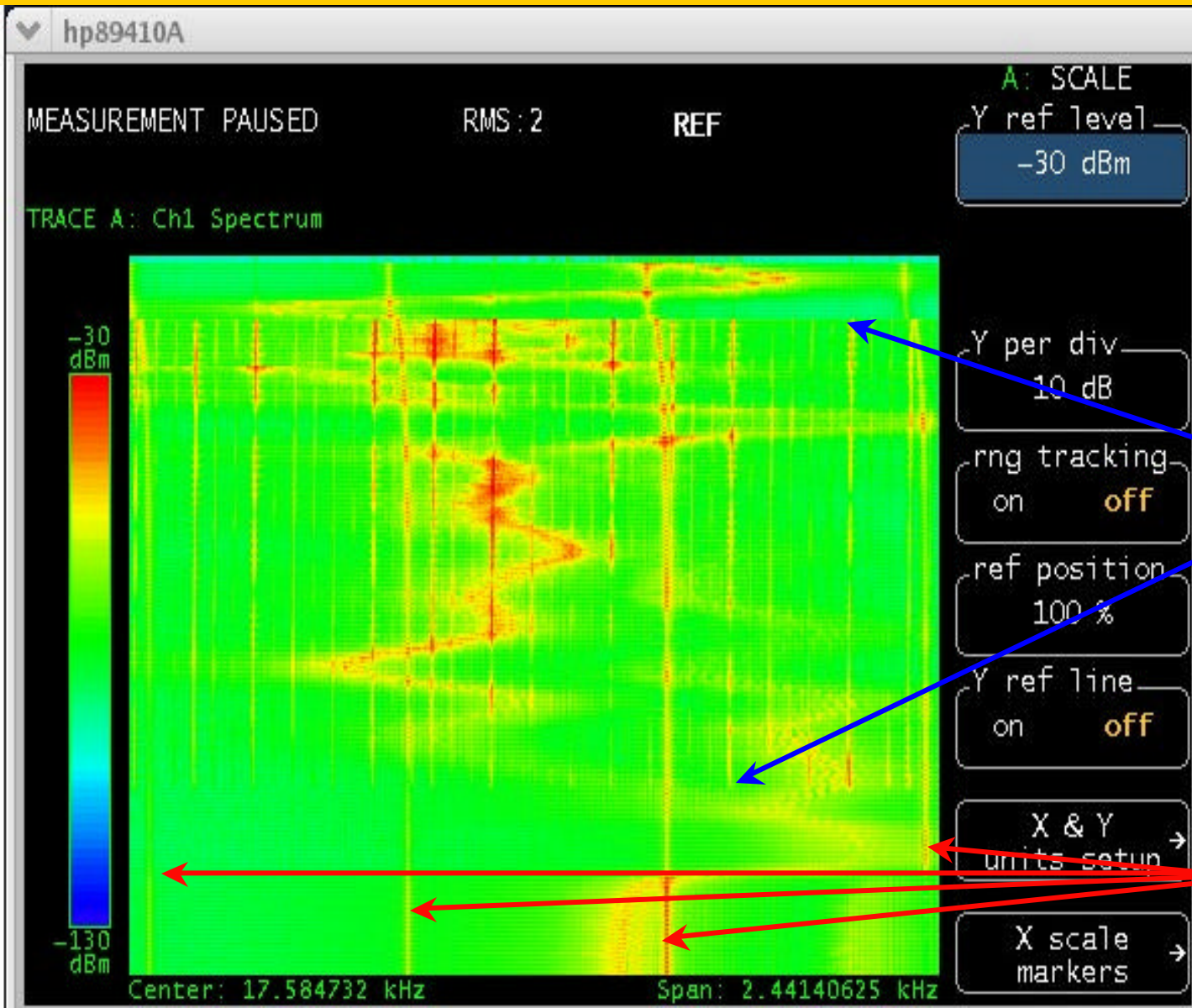
Peter Cameron

TF Workshop Action Items 1



- Tune - all 60Hz
 - LHC magnitude - how to measure/determine 10^{-11} ?
 - balancing - need priority with power supply group
 - filtering - ideas?
- Chrom
 - interaction w/ orbit feedback?
 - include phase error in correction
 - effect of non-linearities at LHC needs evaluation - need/can one feed back on higher orders?
 - RHIC beam exp
 - effect of chrom on baseband performance
 - chrom feedback at inj
 - non-lin?
 - Bruning method will be tested at RHIC next week

3D Ramp - 1 Jan 05



dominant
spacing
is 360Hz

60Hz onset

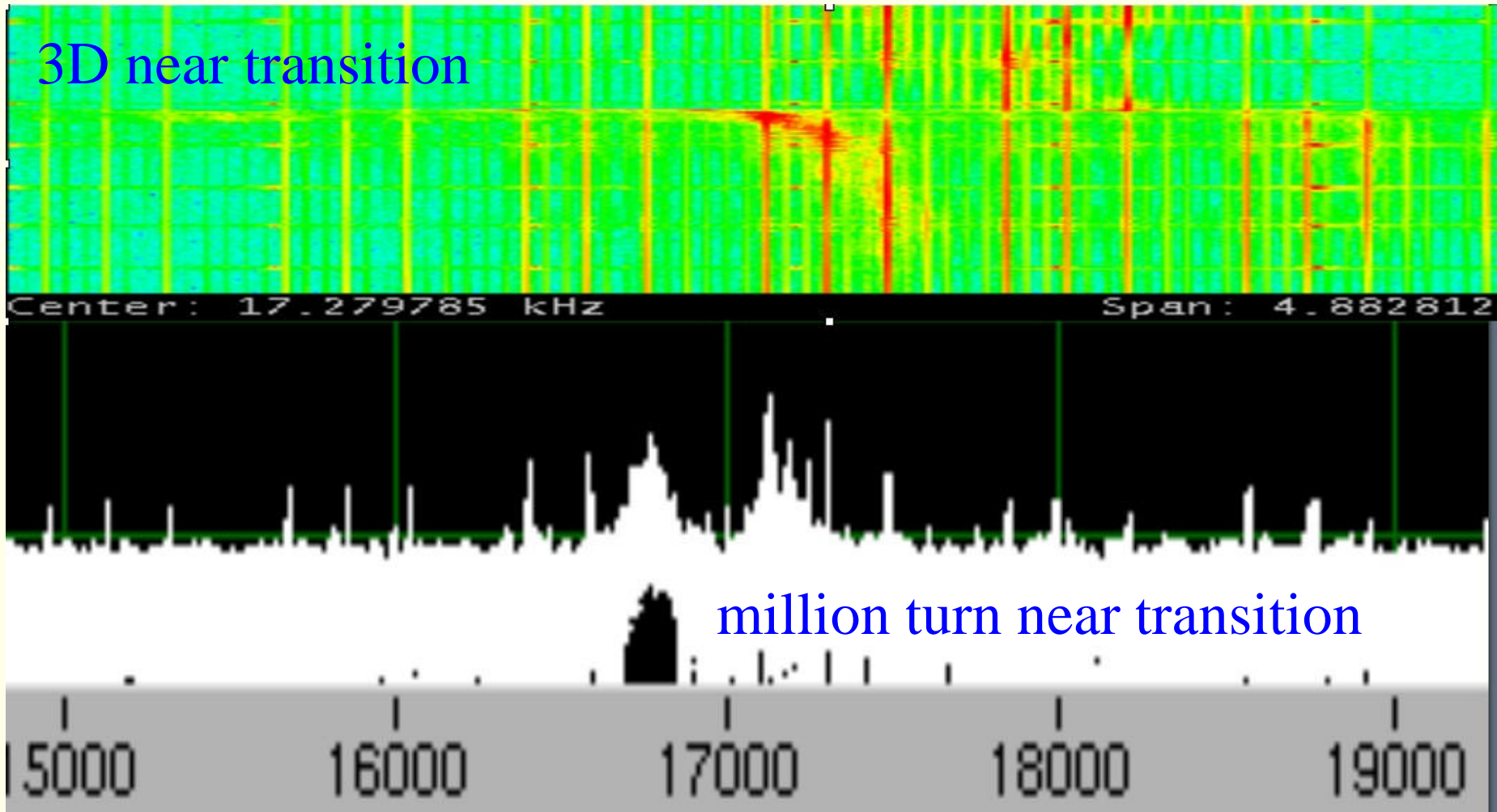
60Hz end

IPM every
100 turns?
(780 Hz)

Million Turn BPM 1



3D near transition

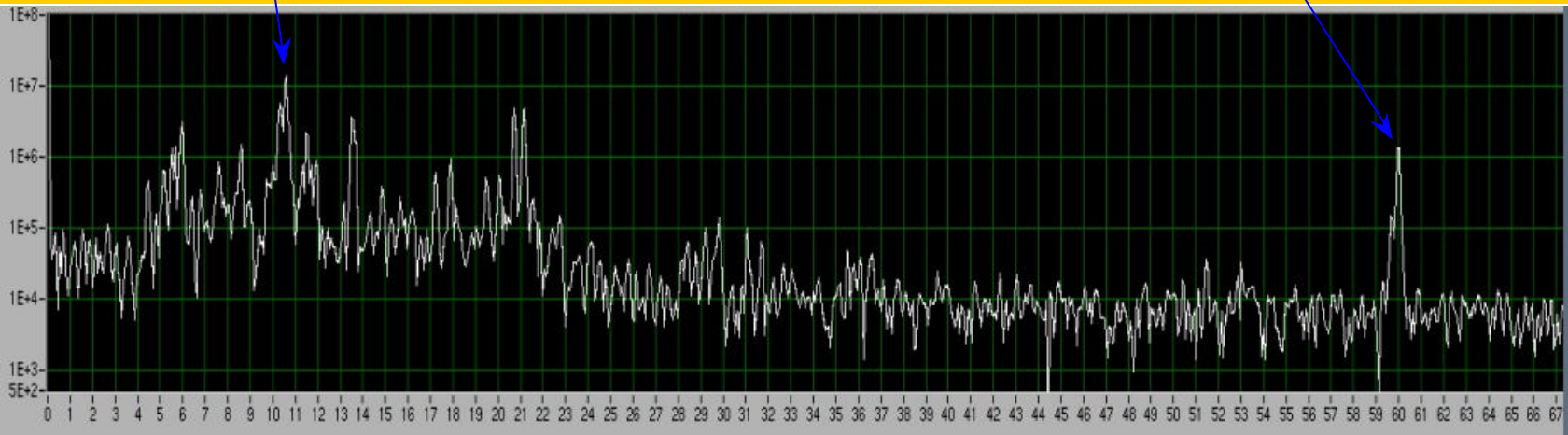


300 micron 10Hz
cryostat vibration
(0dB)

estimate ~5m at betatron line



60Hz (-20dB)

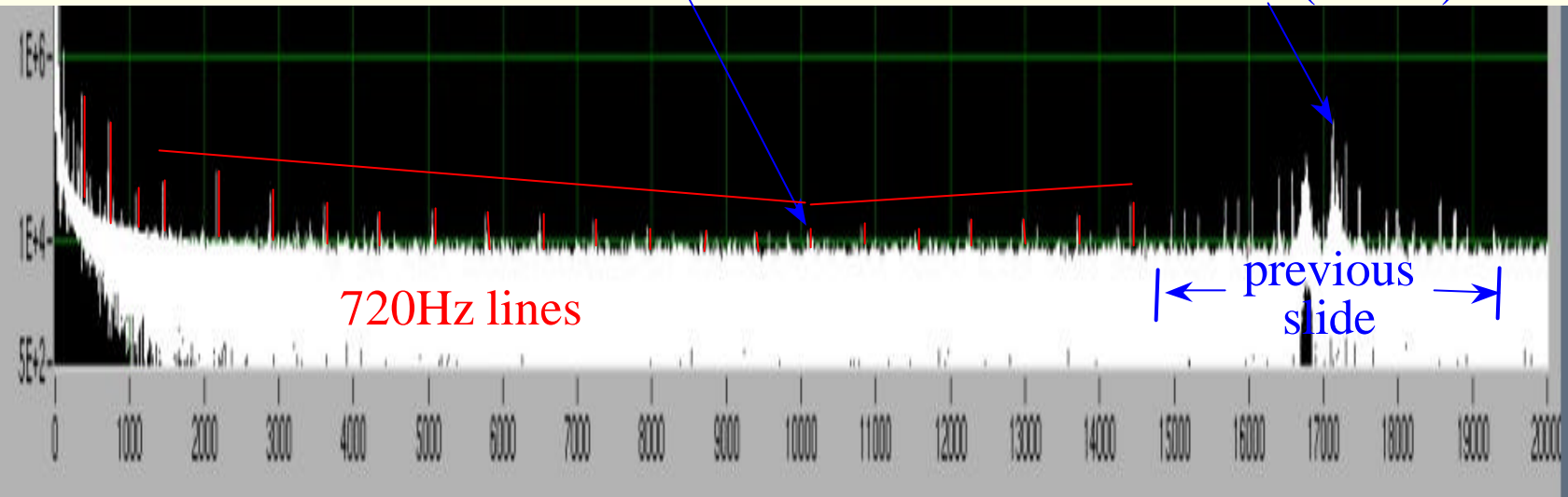


40dB

300nm

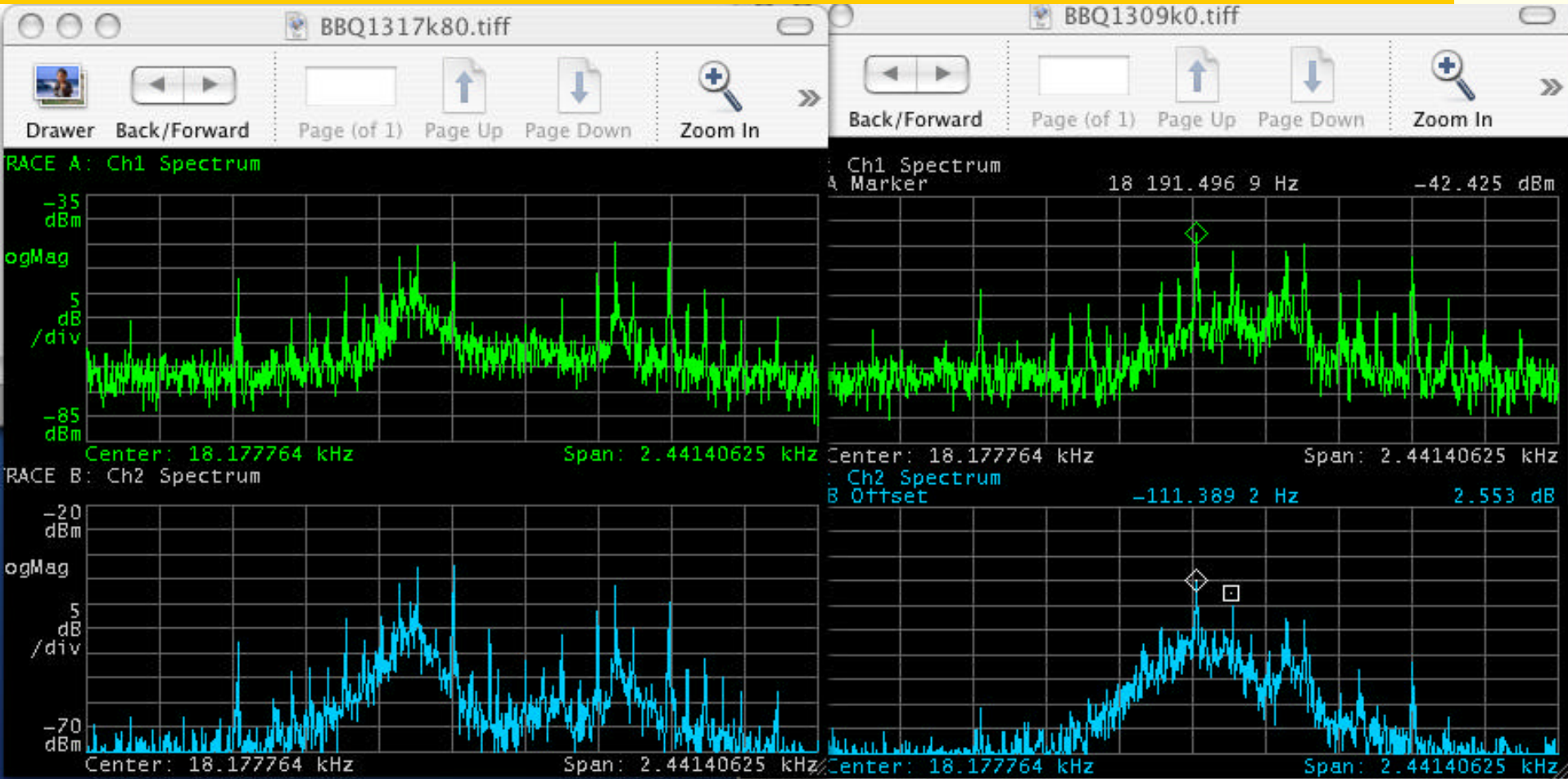
720Hz x 14 (-60dB)

betatron line (-35dB)



the
same
40dB

Effect of Coupling on Spectrum



$k = -0.0008$

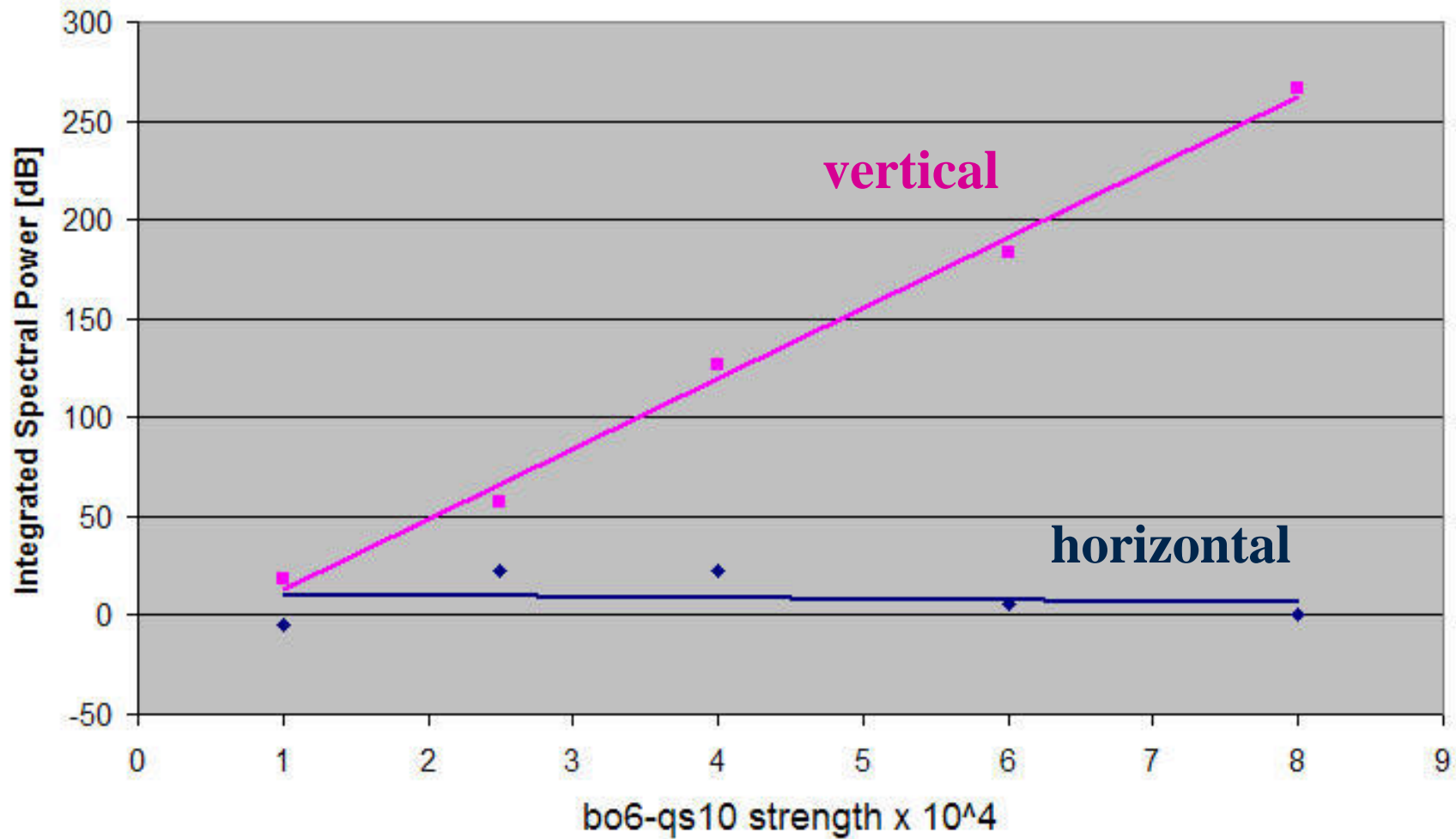
$k = 0$

LARP Collaboration Meeting 6-8 April 2011 upper is horiz, lower vert

coupling 60Hz plot



Variation of Integrated Linestrength with Coupling



60Hz Conclusions

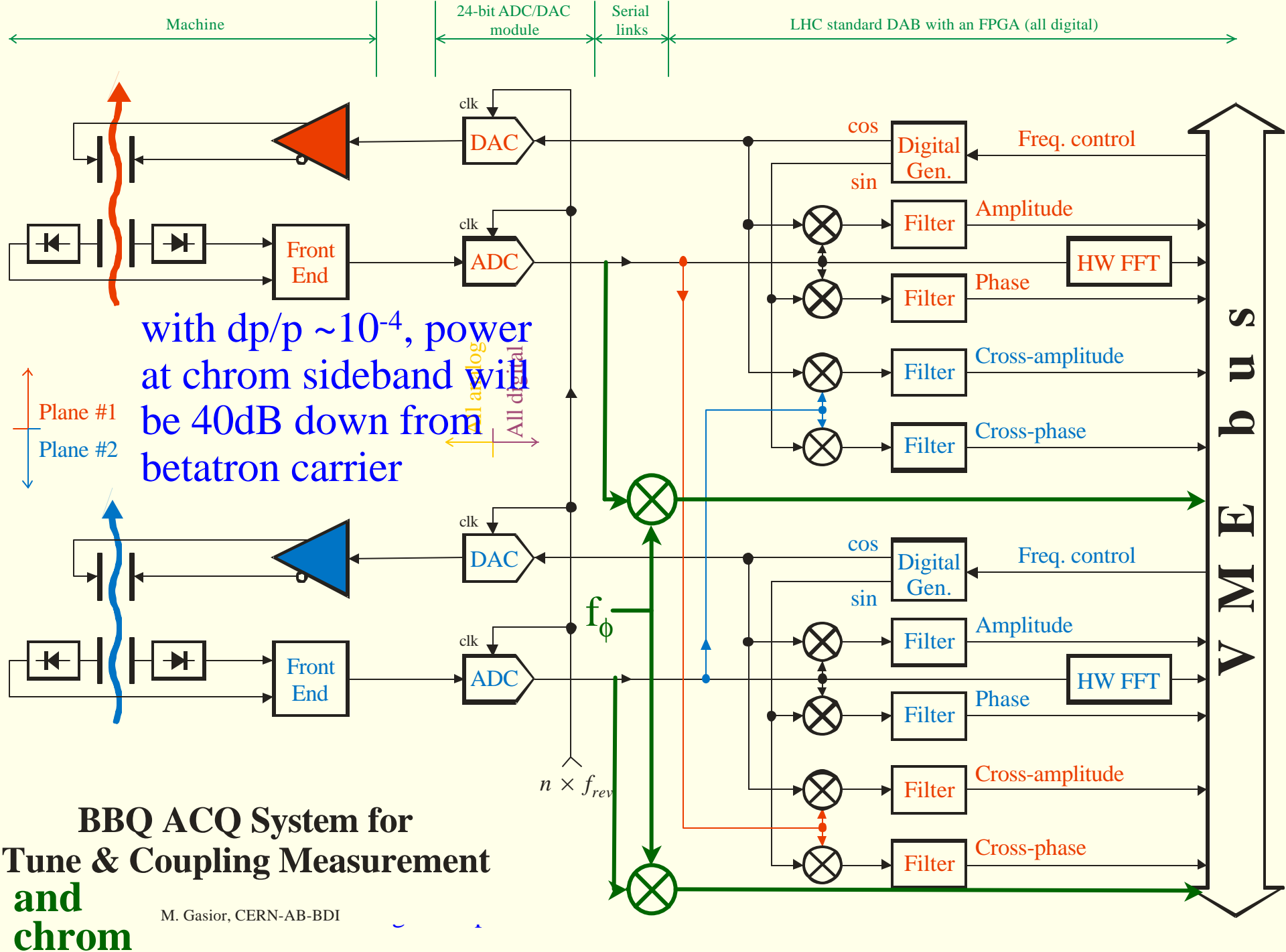


- 60Hz harmonics **are** on the beam
- Statement of excellent sensitivity of BBQ
- It is at baseband, will show up everywhere in the spectrum - we can't escape it
- Required modulation of dipole current at harmonic ~ 300 is actually pretty small - one part in 10^{11}
- High Priority - 720Hz balancing circuit
- High Priority - the approach to filtering
- pre-beam modeling and testing is essential

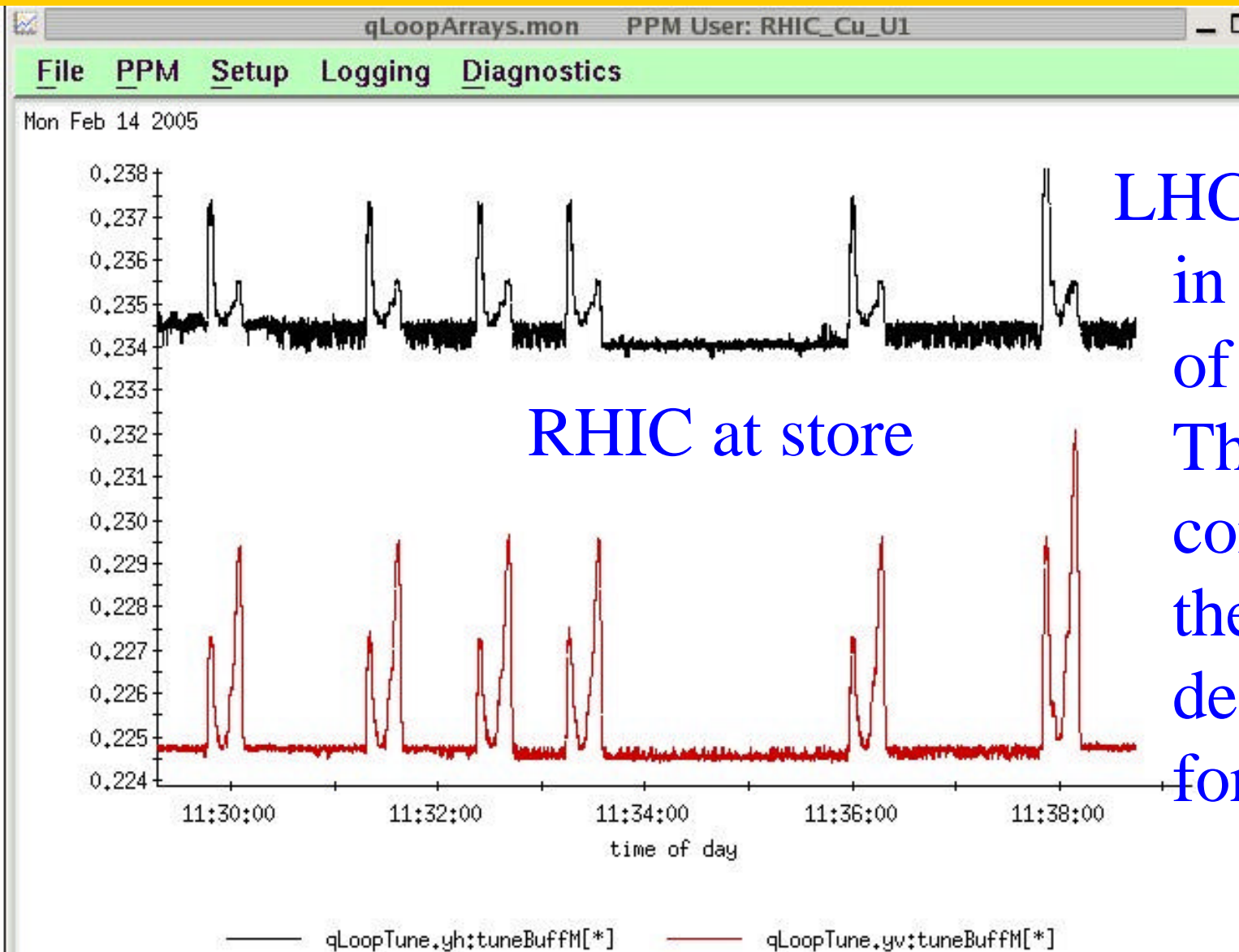
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non-linear Chrom?



LHC Q''_{dp} is
in the range
of 2.5-25.
This is big
compared to
the 1-5
desired value
for chrom

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TF Workshop Action Items 2



- Coupling
 - beam exp
 - 6 parameter measurement and correction
 - coupling feedback test
 - robust PLL, robust tune feedback
 - additional receivers?

3D AFE

- pre-filter & time constant eval - at RHIC this run
- DAB board - delivery, vXworks,...
- FEC - compatability w/ CERN
- Interface to Mgnet and Controls

Design Review Response



1. Can the 2005-2008 resource-loaded action plan be validated? Are resources adequate to meet the schedule?
 - Need more detail - responsibilities, names, costs,...
 - Present plan relies too heavily on one individual
 - backup plan for RHIC run delay until summer 2006
2. Will current design meet tune, chrom, and coupling spec? Is the spec sufficiently detailed and precise?
 - Fully operational baseband feedback system should be implemented in RHIC
 - BBQ is a big step forward, omits need for motion control
 - Coupling - adaptive scheme (robust PLL) could address this problem. Algorithms need to be elaborated and tested
 - 60Hz requires attention
3. Does the spec adequately address the evolution from low-intensity commissioning to high-luminosity operations?
 - Need data with pilot bunch intensities, if possible
 - Nested feedback loops (tune, chrom, coupling, orbit, damper, LLRF,...) need attention

Design Review Response



4. Does the schedule insure high probability that TF will be available when ramping begins? Will TF be needed?
 - Dependent on RHIC testing - need higher priority from department management
 - Contingency plan if RHIC Run-6 is delayed.
5. Is the Control System interface sufficiently well defined?
 - Switch to LynxOS/FESA may be more difficult than anticipated
 - Very close collaboration with CERN Controls required - particularly for May 06 SPS test
 - Remote access encouraged
 - Add data stream for raw time-stamped BBQ data
 - Common software tools for FPGA essential

Design Review Response



6. Is the commissioning plan adequate for this stage of the project? Will sufficient resources (manpower) be in place?
 - Dedicated commissioning time essential
 - Need more resources and planning at BNL
7. What are the prioritized action items?
 - 60Hz problem
 - need detailed system commissioning plan
 - need adequate design flexibility to cope with unanticipated problems, continually changing commissioning conditions